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EXAMINER	
WERNER, BRIAN P	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 07/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/294,137	MAEDA ET AL.	
	Examiner	Art Unit	
	Brian P. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-7,12-15 and 17-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,12-15 and 17-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 31, 2004 (Amendment E, Paper No. 27) has been entered. Claims 1, 2, 4-7, 12-15 and 17-36 remain pending.

Response to Arguments

2. Applicant's arguments with respect to the pending independent claims have been considered but are moot in view of the new ground(s) of rejection advanced herein. The arguments advanced by the applicant that remain relevant will be addressed below.

Summary of Argument: Lee "does not disclose" the "aligning" and the "adjusting a brightness" steps at response page 16, lines 5-10.

Examiner's Response:

First, Lee discloses alignment as described in the rejection below. Lee explicitly states that he "aligns the test and reference images in the x-y plane" and that "the imaging and alignment processes ... are conventional" at column 4,

line 52. However, Lee does not discloses alignment "with an accuracy of one pixel unit" as required, and thus the Maeda reference is introduced to teach this element.

Second, the Michael reference has been introduced into the independent claim rejections to teach this limitation. Refer to the rejections below.

Summary of Argument: Maeda does not disclose that "the first and second images are aligned with an accuracy of one pixel unit" at response page 16, line 15.

Examiner's Response: This is exactly what Maeda teaches, explicitly! First, the examiner construes this limitation (i.e., "aligned with an accuracy of one pixel unit") as aligning two images by pixel-wise shifting one image with respect to the other until an optimal alignment is found. Thus, given that an optimal alignment is found by whole-pixel shifts, the final location at the optimal alignment will be accurate to the pixel unit; and no more or no less accurate.

For example, at specification page 14, lines 12-16, the applicant states, "two pictures ... shifted pixel by pixel from the other while the gradation difference ... is calculated, and the amount of shift at which the gradation difference is the minimum is found". Thus, an alignment with an accuracy of one pixel unit means that two images are aligned by shifting them relative to each other by one pixel-unit until an optical alignment is determined.

Maeda teaches a system in the same field of comparing two images for defects ("... a defect in the pattern is recognized through the comparison" at

column 4, line 23), wherein Maeda teaches a conventional alignment of the two images ("the aligned two patterns" at column 4, line 22) with an accuracy of one pixel unit ("pixel-wise alignment" at column 4, line 33; "shifted one pixel at a time" at column 4, line 37). Maeda teaches (refer to column 4, lines 34-42) that "differences between the detected pattern and the stored pattern [are] summed up or pixels all over the area of the image" while the "stored pattern [is] shifted one pixel at a time relative to the detected pattern", and the images are "brought into a position where the sum total of the differences becomes a minimum, i.e., the two images are best aligned)." Thus, Maeda shifts the images by one pixel unit at a time until a best alignment is achieved. Given that the images are only shifted by one pixel, the accuracy of the final aligned images will have an accuracy of one pixel unit. This teaching fully meets the claimed requirement; particularly as construed by the examiner.

Summary of Argument: Maeda does not disclose alignment "and thereafter" the claimed brightness adjustment at response page 18, first paragraph.

Examiner's Response: Lee suggests a brightness adjustment, with the claimed details being taught by Michael. Maeda is not relied upon as teaching the claimed brightness adjustment.

Summary of Argument: At page 18, bottom paragraph, the applicant recites case law regarding the propriety of an obviousness rejection.

Examiner's Response: The generalized discussion of case law and instructions on formulating a 103 rejection were not helpful in the examiner's quest to understand the alleged errors in the obviousness rejections.

Summary of Argument: "If the alignment is altered in the manner suggested by the Examiner, the resultant would utterly defeat the intended purposes advocated by Lee '735" at response page 19, line 16.

Examiner's Response: Lee requires a conventional alignment method, and Maeda teaches such a method. Nothing in Maeda is repugnant to Lee, and nothing in Maeda changes any of the operating principles of Lee.

Summary of Argument: "Michael '200 does not discloses what size the term "local" indicates and not disclose or suggest to correct the brightness of individual pixels for each pixel" at response page 23, line 15.

Examiner's Response: Claim 7, for example, does not recite a "size" limitation and thus this argument is moot. Regarding correcting the brightness of individual pixels, this is exactly what Michael does. At column 14, line 40, Michael applies a high-pass filter to the image and thus it affects each and every pixel.

Claim Construction

3. The examiner shall interpret the claimed terminology listed below as follows:

Claimed Terminology	Interpretation
"aligned with ***an accuracy of one pixel unit***"; e.g., at claim 1, line 9.	Aligning two images by pixel-wise shifting one image with respect to the other until an optimal alignment is found. For example: "two pictures ... shifted pixel by pixel from the other while the gradation difference ... is calculated, and the amount of shift at which the gradation difference is the minimum is found" at specification page 14, lines 12-16.
"***match a brightness***" of first and second images; e.g., at claim 1, line 11.	The brightness of one or both images is/are adjusted to more closely match the brightness of the other. For example: "the gradations of the two pictures can be well coincident in terms of square error minimum" at specification page 16, line 13.

These two terms have deliberately been construed because of the emphasis placed upon them by the applicant in his written arguments. Thus, it is important for the record that the examiner's construction of these terms be clarified. The terms have been properly construed broadly, but in accordance with the disclosed definitions.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4, 5, 7,12-15, 18, 21-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record) and Maeda et al. (US 5,153,444 A – new art), and further in combination with Michael (US 5,640,200 A – art of record).

Regarding claims 1, 4, 5, 22 and 23,

Lee discloses a system that aligns and compares first and second images (i.e., a test and reference image of a semiconductor) to detect defects. The content of the Lee reference as addressed the previous Office Actions is incorporated herein by reference, and will not be repeated for the sake of brevity.

Regarding the critical limitations and amended limitations as argued by the applicant, Lee discloses:

aligning the first and second images ("aligns the test and reference images in the x-y plane" and "the imaging and alignment processes ... are conventional" at column 4, line 52), and then after the alignment,

adjusting the brightness of one of the first and second images to match a brightness of the first image with a brightness of the second image ("once the

test and reference images are aligned in three dimensions and normalized for intensity ..." at column 6, line 41).

While Lee's alignment is a "conventional alignment" at column 4, line 54, and while conventional alignments have an accuracy of one or fewer pixels, Lee does not explicitly teach the alignment of the two images with an accuracy of one pixel unit. Lee is silent about the accuracy because an accuracy of one or fewer pixels is so well know in the art, it is not necessary to mention.

Further, While Lee teaches a brightness adjustment to mach the brightness of the first and second images, Lee does not teach the adjustment being applied "for each pixel".

Regarding the "alignment difference", Maeda teaches a system in the same field of comparing two images for defects ("... a defect in the pattern is recognized through the comparison" at column 4, line 23), wherein Maeda teaches a conventional alignment of the two images ("the aligned two patterns" at column 4, line 22) with an accuracy of one pixel unit ("pixel-wise alignment" at column 4, line 33; "shifted one pixel at a time" at column 4, line 37). That is, Maeda shifts the images by one pixel unit at a time until a best alignment is achieved. Given that the images are only shifted by one pixel, the accuracy of the final aligned images will have an accuracy of one pixel unit.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize, as the unspecified method of conventionally aligning the first and second images of Lee, the convention alignment method taught by Maeda, because it results in the best alignment of the two images

(Maeda, "best aligned" at column 4, line 42) using a computationally and mathematically simple algorithm (i.e., "the sum total of the differences becomes a minimum" at Maeda, column 4, line 40) and a mechanically simple method of shifting the images ("stored pattern shifted one pixel relative to the stored pattern" at Maeda, column 4, line 37), thus resulting in speed processing with a reduce cost of hardware given the mere simplicity of the alignment operation.

Regarding the "for each pixel" difference, Michael discloses a system in the same field of image processing, and specifically in the same sub-field of comparing a image of a wafer with a reference to detect defects (figure 7), wherein Michael solves the same problem of matching brightness between the two images ("local contrast normalization" at column 14, line 33). Michael teaches a local gradation conversion ("local contrast normalization" at column 14, line 32) to locally to locally match a brightness of the first image with a brightness of the second image (equation 6 at column 14, line 40). Michael's local contrast normalization comprises a brightness filter means ("filter" at column 14, line 36) for adjusting a brightness of one of the aligned images by filtering all images of the patters to match a brightness of the images (equation "6", at column 14, line 40). Thus function is applied to each and every pixel as indicated by equation 6.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the brightness normalization of Lee (i.e., Lee's figure 2A, numeral 220), to locally match brightness as taught by Michael, in order to improve matching accuracy by compensating for "conditions that cause

image intensity to vary slowly with position in the image" (Michael, column 14, line 35).

Regarding claims 7, 15 and 24,

which require both a brightness adjustment and a gradation conversion, a brightness adjustment for each pixel is already taught by the Lee, Maeda and Michael combination above. The "local contrast normalization" taught by Michael as part of the above combination comprises a brightness filter (Michael: "filter" at column 14, line 36), as required by these claims.

The Lee, Maeda and Michael combination does not teach the further claimed gradation conversion of at least one of the images to match a brightness of the images for each pixel. This is a separate claimed step, and not the same as the claimed brightness adjustment.

In addition to the "local contrast normalization" disclosed by Michael and applied to the claims above, Michael also discloses "global contrast normalization" at column 13, line 65. This is an entirely different step from Michaels "local contrast normalization" described above. Michael teaches a global gradation conversion (i.e., column 13, line 65) that adjusts the brightness between test and reference images to compensate for "variations in illumination intensity, amplifier gain and offset, lens aperture and scene content" (column 14, line 2) whereby a function "m" is computed and applied "to each pixel in the input image" (column 14, line 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the brightness normalization of the Lee, Maeda and Michael combination, to further provide a global contrast normalization as taught by Michael, in order to improve matching accuracy by compensating for "variations in illumination intensity, amplifier gain and offset, lens aperture and scene content" (Michael, column 14, line 2).

The limitations of remaining 12-14, 18, 21, 25-29 are met by the above combination as already described.

6. Claims 1, 31, 22 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record), Maeda et al. (US 5,153,444 A – new art) as applied to claim 1 above, and further in combination with Teo (US 6,128,108 A – art of record).

For the sake of brevity, the combination of Lee and Maeda as applied to claim 1 above is incorporated herein by reference. In summary, Lee does not teach an alignment accuracy of one pixel unit, and Maeda teaches this limitation.

Regarding claims 1 and 22, the combination of Lee and Maeda, as applied to claim 1 above, while teaching a brightness adjustment as described, does not teach the adjustment being applied "for each pixel".

Regarding claims 31 and 35 specifically, which further limit the brightness adjustment, Lee does not teach a local gradation conversion as minimizing a sum of squares of differences between the brightness of the first and second images.

Teo discloses a system in the same field of image processing (i.e., "the present invention relates to digital image processing" at column 1, line 5), and same problem solving area of normalizing two images, or matching the brightness of two images ("variation due to different lighting conditions is reduced" at column 2, line 64; images A and B "which were taken under different lighting conditions" at column 8, line 67; "bring the two images into line with one another. Specifically, brightness, contrast and gamma parameters ... are used to modify image color intensity" at column 9, line 7), comprising a local gradation conversion ("once the brightness, contrast and gamma parameters are determined, they are applied to image A" at column 10, line 27; it can be seen from equation 9 that the parameters are applied to each and every pixel as designated by "x,y" and thus the brightness conversion is local, or takes place in local areas) that minimizes a sum of squares of differences between the brightness of the first and second images ("seeks to match as best possible the color intensities of image A ... using a least sum of squares error criterion ... it seeks to minimize the deviation between the color intensities" at column 9, line 23; see equations 3).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to measure and correct the brightness differences between the images of Lee/Maeda, using the minimization of sum of least squares method taught by Tao, in order to reduce variations "due to different lighting conditions" in which the images were acquired (Tao, column 2, line 64), and thereby "bring the two images into line with one another" and specifically,

with respect to "brightness, contrast and gamma parameters" (Tao, column 9, line 7), in a speedy and efficient manner (i.e., Tao, "fast modification of the image ... avoiding the need to compute equation (2) repeatedly" at column 10, line 65). In summary, the teaching of Tao would allow for all of the image parameters (i.e., brightness, contrast and gamma) to be normalized between the two images of Lee, instead of just the brightness alone as required, thereby providing a more accurate image normalization and thus further helping to reduce the indication of false defects due to mismatched images (Lee, column 6, line 16).

7. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record) and Maeda et al. (US 5,153,444 A – new art) as applied to claim 1 above, and further in combination with Haskell et al. (US 6,111,596 – art of record).

For the sake of brevity, the combination of Lee and Maeda as applied to claim 1 above is incorporated herein by reference. In summary, Lee does not teach an alignment accuracy of one pixel unit, and Maeda teaches this limitation.

Regarding claim 1, the combination of Lee and Maeda, as applied to claim 1 above, while teaching a brightness adjustment as described, does not teach a linear conversion of the gain and offset so that the brightness of the images can be made equal.

Haskell discloses an image process system in the same area of adjusting two images so that their overall brightness is the same ("mismatch in brightness and/or color balance between the two views of a scene due to differences in

imaging parameters is rectified" at column 4, line 15), comprising matching the brightness of two images by means of a linear conversion of gain and offset ("gain and offset differences not only for luminance but also for chrominance are corrected" at column 4, line 13; specifically, see "Method 1" at column 6, line 20; "gain and offset values that must be applied to the right-view image to correct for mismatch can be obtained by solving two simultaneous equations" at column 6, line 34; the equation for gain, "a", is at column 6, line 47 and offset, "b" at line 43; the equations are linear [i.e., not exponential] and thus the correction is linear). The technique of method 1 is best applied to "images having histograms with at least two uniquely identifiable points with ... 'very dark' and 'very bright' contents" as described at column 6, line 21.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Lee/Maeda combination by matching the brightness of the Lee using a linear conversion of gain and offset as taught by Haskell, in order to more accurately correct for image brightness difference by factoring in both gain and offset, as opposed to just a simple histogram adjustment as is currently disclosed by Lee, and to provide the additional benefit of correcting a chrominance mismatch (in addition to the luminance, or brightness) thereby providing Lee the ability to utilize color images, to more accurately represent the semiconductor under inspection.

8. Claim 6, 19 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record), Maeda et al. (US 5,153,444 A – new art) and Michael (US 5,640,200 A – art of record) as applied to claims 1, 15 and 27 above, and further in combination with Wagner et al. (US 5,659,172 – art of record).

The Lee/Maeda/Michael combination does not disclose picking up the first and second images using an electron beam.

Wagner discloses a system in the same field of endeavor of semiconductor wafer inspection ("detection of defects on semiconductor wafers" at column 1, line 11), comprising picking up images to be inspected using an electron beam (figure 1, numeral 32; see "SEM 22 electron beam 32" at column 4, line 64; "images of an area of the semiconductor wafer which is to be inspected" at column 3, line 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize an electron beam scanner as taught by Wagner, as the image pick-up source of the Lee/Maeda/Michael combination, in order to detect defects the size of which "falls below the resolution of conventional light optics" (Wagner, column 1, line 43) because of the scanning microscope's ability to resolve "features more that an order of magnitude smaller than the wavelength of visible light" (Wagner, column 1, line 51), thereby improving defect detection sensitivity and thus accuracy.

9. Claims 32, 33, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record), Maeda et al. (US 5,153,444 A – new art) and Michael (US 5,640,200 A – art of record) as applied to claims 7, 14, 15 and 27 above, and further in combination with Teo (US 6,128,108 A – art of record).

The Lee/Maeda/Michael combination teaches a global gradation conversion as described above. However, the combination does not teach the global gradation conversion as minimizing a sum of squares of differences between the brightness of the first and second images.

Teo discloses a system in the same field of image processing (i.e., "the present invention relates to digital image processing" at column 1, line 5), and same problem solving area of normalizing two images, or matching the brightness of two images ("variation due to different lighting conditions is reduced" at column 2, line 64; images A and B "which were taken under different lighting conditions" at column 8, line 67; "bring the two images into line with one another. Specifically, brightness, contrast and gamma parameters ... are used to modify image color intensity" at column 9, line 7), comprising a local gradation conversion ("once the brightness, contrast and gamma parameters are determined, they are applied to image A" at column 10, line 27; it can be seen from equation 9 that the parameters are applied to each and every pixel as designated by "x,y" and thus the brightness conversion is local, or takes place in local areas) that minimizes a sum of squares of differences between the brightness of the first and second images ("seeks to match as best possible the

color intensities of image A ... using a least sum of squares error criterion ... it seeks to minimize the deviation between the color intensities" at column 9, line 23; see equations 3).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to perform the global gradation conversion by measuring and correcting the brightness differences between the images of Lee/Maeda/Michael, using the minimization of sum of least squares method taught by Tao, in order to reduce variations "due to different lighting conditions" in which the images were acquired (Tao, column 2, line 64), and thereby "bring the two images into line with one another" and specifically, with respect to "brightness, contrast and gamma parameters" (Tao, column 9, line 7), in a speedy and efficient manner (i.e., Tao, "fast modification of the image ... avoiding the need to compute equation (2) repeatedly" at column 10, line 65). In summary, the teaching of Tao would allow for all of the image parameters (i.e., brightness, contrast and gamma) to be normalized between the two images of Lee, instead of just the brightness alone as required, thereby providing a more accurate image normalization and thus further helping to reduce the indication of false defects due to mismatched images (Lee, column 6, line 16).

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record), Maeda et al. (US 5,153,444 A – new art) and Michael (US 5,640,200 A – art of record) as applied to claim 15 above, and further in combination with Haskell et al. (US 6,111,596 – art of record).

The Lee/Maeda/Michael combination does not teach a linear conversion of the gain and offset so that the brightness of the images can be made equal.

Haskell discloses an image process system in the same area of adjusting two images so that their overall brightness is the same ("mismatch in brightness and/or color balance between the two views of a scene due to differences in imaging parameters is rectified" at column 4, line 15), comprising matching the brightness of two images by means of a linear conversion of gain and offset ("gain and offset differences not only for luminance but also for chrominance are corrected" at column 4, line 13; specifically, see "Method 1" at column 6, line 20; "gain and offset values that must be applied to the right-view image to correct for mismatch can be obtained by solving two simultaneous equations" at column 6, line 34; the equation for gain, "a", is at column 6, line 47 and offset, "b" at line 43; the equations are linear [i.e., not exponential] and thus the correction is linear). The technique of method 1 is best applied to "images having histograms with at least two uniquely identifiable points with ... 'very dark' and 'very bright' contents" as described at column 6, line 21.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Lee/Maeda/Michael combination by

matching the brightness of the Lee using a linear conversion of gain and offset as taught by Haskell, in order to more accurately correct for image brightness difference by factoring in both gain and offset, as opposed to just a simple histogram adjustment as is currently disclosed by Lee, and to provide the additional benefit of correcting a chrominance mismatch (in addition to the luminance, or brightness) thereby providing Lee the ability to utilize color images, to more accurately represent the semiconductor under inspection.

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 5,808,735 A – art of record), Maeda et al. (US 5,153,444 A – new art) and Michael (US 5,640,200 A – art of record) as applied to claim 15 above, and further in combination with Wihl (US 4,633,504 A – art of record).

While the Lee/Maeda/Michael combination teaches a monitor for displaying inspection related information (Lee, figure 1, numeral 60), Lee does not explicitly teach displaying information of a brightness, a local contrast or a local average of the first and second images.

Wihl discloses an optical inspection system comprising comparing first and second images for a defect, wherein Wihl teaches displaying brightness information of the first and second images ("visual display of the inspected die" at column 4, line 67; both dies are inspected, and the operator can view either; a visual display of the actual die is a display of the brightness information of the die).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to display (using the display of Lee) the inspection images of the Lee/Maeda/Michael combination as taught by Wihl, in order to provide the operator with the opportunity to view the actual inspection images himself to further ensure that no defects were missed by the automated inspection, and/or to verify the automated inspection results.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRIAN WERNER
PRIMARY EXAMINER

Brian Werner
Primary Examiner
Art Unit 2621